Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
SYS0010	The ground system shall observe the current NASA policy directive, NPD 8010.2C, Use of the Metric System of Measurement in NASA programs.	3.5.1.12	Launch or Mission									Test, Analysis, Inspection, Demonstration	If Fail Discrepancy Number mandatory
SYS0020	The ground system shall process observatory telemetry that is compliant with the CCSDS Packet Telemetry Recommendations as defined in the Series 100 Blue Books.	3.1.2.5.1.1 3.1.4.3.1.2 3.5.2.4.1	L	X								T	Decompose sys level to element level. Others are already decomposed.
SYS0030	The ground system shall implement observatory commanding that is compliant with the CCSDS Telecommand recommendations as defined in the Series 200 Blue Books.	3.1.4.3.1.2	L		X							T	

Requirement				Planned Verification									Re:
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
SYS0040	The ground system shall use Universal Time Coordinated (UTC) time as the time base for all operations activities.	Derived	L	X							T	
SYS0050	The ground system shall to plan and schedule science observations for the observatory.	3.5.2.3	L			X					T	
SYS0060	The ground system shall generate and send commands to the observatory.	3.5.2.2 3.5.2.3	L	X						X	T	
SYS0070	The ground system shall process and archive all telemetry received from the observatory.	3.5.2.2 3.5.2.3 3.5.2.4	M	X		X				X	T	
SYS0080	The ground system shall provide RF communications for the transmission of commands and telemetry to/from the observatory via the Ground Network (GN) and the Space Network (SN).	3.1.1.5.1	L				X	X		X	T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
SYS0090	The ground system shall provide the ground communications network for the exchange of mission data among the ground system elements.	3.5.1.11	L	X							T	
SYS0100	The ground system shall perform health and safety monitoring of the observatory.	3.5.2.2	L	X							T	
SYS0110	The ground system shall process and archive all science data received from the observatory.	3.5.2.4	M	X			X				T	
SYS0120	The ground system shall provide the tools and interfaces necessary to support sustaining engineering of the observatory for the life of the mission.	3.5.2.2	M				X	X			A	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
SYS0130	The ground system shall relay burst alerts to the science community via the Gamma-ray Coordinates Network (GCN) within 6 seconds for at least 80% of all burst alerts.	3.5.2.8 3.1.4.1.2 3.1.4.1.3	M			X	X			E	A		
SYS0140	The ground system shall support a single higher level science analysis software environment for use by the science community and instrument teams.	3.5.1.4	M				X				A		
SYS0150	The ground system science analysis shall adhere to standards that ensure software portability, independence of vendor and compatibility with existing multi-mission high energy astrophysics tools.	3.5.1.5	M				X				A		

	Requirement			Planned Verification								Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments
				G1	G2	G3	G4	G5	G6	ETE		
SYS0160	The ground system shall execute a ToO order within 6 hours of approval of a ToO request from the Project Scientist.	3.5.2.7.2	M					X			T	
SYS0170	The ground system shall support the observatory in-orbit checkout period.	3.5.1.7	L							E1	A	
SYS0180	The ground system shall meet all requirements with the observatory at any orbit altitude between 575km and 450 km.	3.5.1.9.4	L							E1	A	
SYS0190	The ground system shall use the J2000 inertial coordinate system.	3.5.1.10	L	X							T	
SYS0200	The ground system shall use RA and DEC as the standard means of receiving and communicating pointing directions.	3.5.1.10.2	L		X			X			T	

Requirement				Planned Verification									Re:
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
SYS0210	The ground system shall have the command capability to reorient the observatory to within the pointing envelope of the sky survey mode for downlink transmissions of science data.	3.5.2.1.1	M							E	T, A		
SYS0220	The ground system shall command the observatory to pointed observation mode in order to acquire observation data on known celestial sources.	3.5.2.1.2	M							E	T, A		
SYS0230	The ground system shall maintain the SAA boundary definitions on-board the observatory and on the ground for the instruments and observatory during the course of the mission.	3.5.2.2.3	M							E	T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
SYS0240	The ground system shall be able to capture and process a dump of at least 36 hours of recorded science and housekeeping data.	3.5.2.4.2	M				X				T		
SYS0500	The ground system shall comply with Information Technology (IT) security requirements specified in NPG 2810.1.	3.5.1.2	L	X							A		
SYS1000	The ground system shall operate the observatory 24hours/day 365+ days/year.	Derived	L					X			A		
SYS1010	The ground system shall use communication links that provide error-free data transmission and delivery.	3.5.1.11	L								A		
SYS1020	The ground system shall implement all approved ToOs that satisfy observatory constraints.	Derived	M					X		E	T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SYS1025	The ground system shall implement at least 95% (TBD) of approved ToOs within the allocated latency.	Derived	M					X		E	A	
SYS1030	The ground system's contribution to Spacecraft Data Loss shall be less than 1.9%.	3.5.2.4.4	M				X				A	
SYS1050	The ground system shall provide a reliability of 99.98% for launch critical functions.	Derived	L	X	X	X					A	
SYS2000	The ground system shall process the observatory data into science data products within 72 hours 95% of the time.	3.1.4.4	M				X				T, A	
SYS2010	The ground system shall be able to capture and process a dump of at least 36 hours of recorded science and housekeeping data.	3.5.2.4.2	M				X				T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
SYS2020	The ground system shall process data with an orbit average generation rate of 300 kbps for LAT, 12 kbps for GBM, and 51 kbps observatory housekeeping data.	3.1.1.5.1.3	L	X			X				T	
SYS3000	The ground system shall provide the unique capabilities to support pre-launch testing.	3.5.1.6 derived	L	X							A	
SYS4000	The ground system shall ensure that the MOC is the sole interface between the ground system elements and the space-ground communications links.	3.5.3.1.1	L		X						T	
SYS9000	The ground system shall ensure that no single point of failure exists for launch critical functions.	3.3.1.5	L	X	X						A	derived from observatory requirement

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GCOM0020	During the pre-launch, launch, and early orbit phases, the ground communications network shall provide secure dedicated Closed Circuit Loop (CCL) or Station Conferencing and Monitoring Assembly (SCAMA) voice communications between the MOC and: Ground Stations, WSC, FDF, GSSC, GCN, LAT IOC, GBM IOC, Spacecraft I&T Facility, KSC	Derived	L				X	X			T		

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GCOM0030	During the normal operations phases, the ground communications network shall provide secure dedicated CCL or SCAMA voice communications between the MOC and: Ground Stations, WSC, FDF, GSSC, GCN, LAT IOC, GBM IOC	Derived	L	X	X	X	X	X			T	This defines the required access to the Goddard Voice Distribution System (VDS) for SCAMA and CCL support* = located at GSFC^^ = Black Phone Black phones can be patched into the voice communications network.	
GCOM1000	The ground communications network shall ensure that all circuits supporting real-time operations have the capability to fail-over within 1 minute.	Derived	L	X	X	X	X	X			T, A		

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GCOM1010	The ground communications network support all scheduled activities required by the MOC.	Derived				X						D	
GCOM2000	The ground communications network shall provide the bandwidth required to transfer 10 hours of recorded observatory data (science and HK) within 4 hours from the SN to the MOC.	Derived	M		X	X						T	
GCOM2020	The ground communications network shall transmit observatory data from the MOC to the IOCs and GSSC within 3 hours (TBD).	Derived, MSS Latency Trace	M		X	X						T	The requirement for getting data from the ground stations to the MOC is covered in the GN requirements.

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
GCOM3000	The ground communications network shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived						X			D	This includes planning, performing and assessing the tests.	
GCOM4000	The GCOM shall transmit real-time data within 1 second between the MOC and the SN.	Derived	L								T	Time begins when first bit of the CADU hits the network and ends when the transmission of that bit reaches the MOC.	
GCOM4010	The GCOM shall transmit real-time data within 1 second between the MOC and the ground station.	Derived	L								T	Time begins when first bit of the CADU hits the network and ends when the transmission of that bit reaches the MOC.	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GCOM7000	The ground communications network shall be capable of operating with an unattended MOC.	Derived	M					X			D	
GCOM8000	The ground communications network shall transmit burst alerts from the SN to the MOC within .5 seconds for at least 80% of the burst alerts.	Derived	M				X	X			T, A	The Ground System's ability to meet the burst alert latency requirements is TBR.
GCOM8010	The ground communications network shall transmit burst alerts from the ground stations to the MOC within .5 seconds for at least 80% of the burst alerts.	Derived	M				X	X			T, A	The Ground System's ability to meet the burst alert latency requirements is TBR.
GCOM9000	The ground communications network shall support troubleshooting and resolution of voice and data anomalies.	Derived	L	X	X						D	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GN0010	The ground stations shall provide telemetry and command RF communications interface between the GLAST observatory and the MOC.	Derived	L							X	T, A		
GN0020	The ground station shall accept observatory data with data randomization, convolutional encoding, RS encoding and balanced QPSK interleaving across the I&Q channels.	Derived	L							X	T		
GN0030	The ground station shall remove all artifacts of the space to ground transmission such as encoding and randomization.	Derived	L							X	T		
GN0500	The ground station shall accept commands, schedule requests, and acquisition data only from the MOC.	3.5.1.2	L				X				D		

Requirement				Planned Verification									Re:
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GN0510	The communications between the Ground Station and the MOC shall only be accessible to authorized users.	3.5.1.2	L				X				D		
GN1010	The ground station network shall be available at minimum 99.98% of the time.	Derived	M				X				A		
GN1020	The ground station shall coordinate interface fault isolation and recovery with the MOC whenever required.	3.4.3.1.2.2	L				X				D		
GN1500	The ground station shall transmit and receive products with/from the MOC as defined in the Ground Station/MOC ICD.	Derived	L				X				T	This would include products such as: Station status messages, orbit data, schedules, and telemetry and command

	Requirement				Planned Verification									Re:
					Test									
Requirement ID	Requirement Text	MSS Source ID	Criticality									Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE				
GN1510	The ground station shall exchange telemetry and command data with the GLAST Observatory as specified in the Observatory to Ground ICD.	Derived	L				X				T, A	The ground stations will receive NRZ-M and transmit NRZ-L.	
GN2000	The ground station shall be required to capture downlinked S-band data sent from the GLAST Observatory.	3.4.3.3.4	L				X				T, A	This is for contingency support.	
GN2010	The ground station shall be able to send 24 hours of observatory housekeeping data to the MOC within 5 hours of receipt.	Derived	M				X				T		
GN2030	The ground station shall archive all data from the GLAST Observatory for a minimum of 7 days, for possible retransmission to the MOC.	3.4.3.3.6 3.4.3.3.7	M				X				A		

	Requirement			Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
GN2040	The ground station shall initiate the retransmission of data to the MOC within 1 hour of receiving the retransmission request from the MOC.	3.4.3.3.7	M				X				T		
GN2050	The ground station shall store telemetry data from each VC in a separate file.	Derived	M				X				T		
GN2060	The ground station shall selectively transmit the stored VC files to the MOC.	Derived	M				X				T		
GN2070	The ground station shall provide real-time station status data to the MOC, including antenna angles, received signal strength, and any other station equipment status required by the MOC.	Derived	M				X				T, A		

	Requirement			Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GN3010	The ground stations shall provide the personnel and facilities to support interface and system test activities.	Derived	L				X				D	This includes planning, performing and assessing the tests	
GN3020	The ground stations shall perform RF interface testing with the S/C at the spacecraft I&T facility.	Derived	L				X				D	This would be supported via an RF suitcase unit or the CTV	
GN3500	The ground station shall implement all required site resource planning and scheduling functions.	Derived	L				X				D		
GN3510	The ground stations shall schedule a total of at least three (3) real-time contact passes per day for contingency S-band support.	Derived	L				X				D, A	These passes may be distributed among two or more sites.	
GN3530	The ground stations shall accept schedule requests for specific contact times from the MOC for the purpose of scheduling ground contacts.	Derived	M				X				T		

	Requirement						Planned Verification							Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**		
				G1	G2	G3	G4	G5	G6	ETE				
GN3540	The ground stations shall provide long-range predictions of planned site usage by other missions for GLAST mission planning purposes. Thought Sites don't give other usage predicts.	Derived	M				X				T	The MOC will use this is informational purposes only and is not intended for the MOC to do conflict resolution.		
GN3550	The ground stations shall resolve station resource conflicts with other missions.	Derived	M				X				A			
GN3560	The ground station shall provide a schedule of supports for the upcoming two weeks, each week.	Derived	M				X				T	Two weeks is dependent on ATS load time scale. This number should be double the duration of a typical ATS load.		
GN3570	The ground station shall accept the updated orbit data from the MOC to perform station scheduling.	Derived	L				X				T	Used for station scheduling and S/C tracking		

Requirement				Planned Verification								Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE		
GN3580	The ground station shall be able to propagate the observatory orbit using data provided by the MOC to perform station scheduling and tracking.	Derived	L				X				T	Used for S/C acquisition and tracking during a contact
GN4000	The ground station shall provide the following services to/from the S/C simultaneously: 1) S-band Real-time Telemetry; 2) S-Band Playback Telemetry; 3) S-band Command.	3.4.3.3.1	L				X				T	
GN4005	The ground station shall uplink commands and data to the observatory received from the MOC.	3.4.3.3.2	L				X				T	
GN4010	The ground station shall throughput the command data received from the MOC in real-time, without buffering, filtering, reformatting, processing or staging.	Derived	L				X				A	

	Requirement			Planned Verification								Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE		
GN4020	The ground station shall perform virtual channel synchronization and error correction, using the CCSDS AOS standards.	3.1.4.3.2	L				X				T	
GN4030	The ground station shall send real-time data to the MOC in real-time, without buffering, filtering, reformatting, processing, or staging.	Derived	L				X				T	The specific parameters will be in the Ground Station/MOC ICD.
GN4040	The ground station shall provide real-time data quality statistics to the MOC including frame counts, missing VCDUs uncorrectable VCDUs, and any other data statistics required by the MOC.	Derived	M				X				T	The specific parameters will be in the Ground Station/MOC ICD.
GN4050	The ground station shall sort and process the observatory data by VC.	Derived	L				X				T	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GN4060	The ground system shall forward telemetry frames from real-time VCs to the MOC within 1 second.	Derived	L				X				T, A	Time begins when the first bit of the CADU hits the antenna and ends when the transmission of that bit to the MOC begins. This does not include network transmission time.	
GN4070	The ground station shall forward command data received from the MOC to the S/C within 1 second.	Derived	L				X				T, A	Time begins when the first bit of a command is received by the station from the MOC and ends when that bit leaves the ground station antenna. This does not include network transmission time.	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GN4090	The ground station shall provide real-time telemetry and command services while simultaneously flowing playback telemetry from a prior pass or from the station archive to the MOC.	Derived	L				X				T	This requirement ensures that the ground station can operate in real-time while forwarding stored data from a previous contact.
GN4100	The ground station shall process an aggregate real-time VC rate (up to 4 VC's) of at least 200 kbps.	Derived					X				T	
GN4110	The ground station shall receive S-band downlink data at a rate of 2.5 Mbps.	3.4.3.3.2					X				T	
GN4150	The ground station shall provide an S-band command uplink data rate of 2 kbps.	3.4.3.3.2								X	T	Support for lower rates may be required

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GN7000	The ground station shall operate with an unattended MOC.	3.4.3.2					X				T, A	This includes planning and scheduling, pre-pass, real-time, post-pass, and routine analysis support to the MOC	
GN8000	The ground station shall process real-time burst alerts at any time during a contact.	3.5.2.8 3.4.2.2.1						X			T		
GN8020	The ground station shall provide burst alerts to the MOC within 5.5 seconds of receipt of the signal from the observatory 95% of the time.	3.1.4.1						X			T, A	This is derived by combining the 5 second allocation for TDRSS and the 0.5 second allocation for the SN/MOC data link.	
GN9000	The ground station shall support troubleshooting and resolution of voice and data anomalies.	Derived					X				D		

	Requirement			Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GN9010	The ground station network shall schedule a station within 15 minutes if the station will be in view of the S/C in the event that the MOC declares a S/C emergency.	Derived					X				D		
SN0010	The SN shall provide telemetry and command RF communications interface between the GLAST observatory and the MOC.	Derived			X	X					T		
SN0015	The SN shall support a minimum of 4 contacts (Ku-band return/S-band forward) per day of at least 5 minutes in duration per contact.	Derived				X		X			D		
SN0016	The SN shall ensure that the provided contacts (Ku-band return/S-band forward) are no more than of 8 hours apart.	Derived				X					D		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SN0020	The SN shall accept observatory data with data randomization, convolutional encoding, RS encoding and balanced QPSK interleaving across the I&Q channels.	Derived				X						T	
SN0030	The SN shall remove all artifacts of the space to ground transmission such as encoding and randomization.	Derived				X						T	This is intended to be implemented by the Ku-band front end processor (FEP).
SN0500	The SN shall accept commands, schedule requests, acquisition data, or other GLAST-related control data only from the MOC.	3.5.1.2			X							D	
SN0510	The communications between the SN and the MOC shall only be accessible by authorized users.	3.5.1.2			X							D	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
SN1000	The SN shall support 98% (TBD) of the ToO schedule requests.	Derived							X		D		
SN1020	The SN shall provide Demand Access S-band service on a 24x7 basis.	Derived				X					D, A		
SN1030	The SN shall deliver at least 99.98% of the data it receives to the MOC.	Derived							X		A	This includes S-band and Ku-band data.	
SN1015	The SN shall contribute a data loss of no more than 0.9%.	3.5.2.4.4						X			A	The total allocation for the ground system is 1.9%.	
SN1500	The scheduled SN services shall transmit and receive products with/from the MOC as defined in the SN/MOC ICD.	Derived			X	X	X	X	X		T	This would include products such as: Station status messages, orbit data, schedules, and telemetry and commands. The SN will receive NRZ-M and transmit NRZ-L.	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SN1510	The scheduled SN services shall exchange telemetry and command data with the GLAST Observatory as specified in the Observatory to SN ICD.	Derived			X			X			T	
SN1520	The SN DAS shall transmit telemetry to the MOC.	Derived			X	X					T	
SN1530	The SN DAS shall receive telemetry from the GLAST Observatory.	Derived						X		X	T	DAS service will be provided for ToO execution, auto-repoint, and S/C anomalies.
SN1540	The SN shall provide DOWD data to the FDF (TBR).	Derived			X						T	DOWD is the Differenced One-Way Doppler approach to orbit determination.
SN2000	The SN shall record all downlinked S-band data sent from the GLAST Observatory.	Derived			X	X					T, A	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
SN2005	The SN shall record all downlinked Ku-band data sent from the GLAST Observatory.	Derived				X		X			T, A	This is intended to be implemented by the Ku-band front end processor (FEP).	
SN2010	The SN shall archive all S-band data from the GLAST Observatory for a minimum of 50 hours.	Derived				X					A	This is for possible retransmission to the MOC.	
SN2020	The SN shall nominally initiate transfers of recorded Ku-band dump data within 1 hour of the completion of each contact.	Derived				X		X			T	The transfer rate over the network link is specified in the GCOM section.	
SN2010	The SN shall be able to send 10 hours of observatory HK data to the MOC within 5 hours of receipt.	Derived									T	This is for contingency support.	
SN2020	The SN shall initiate the retransmission of data to the MOC within 1 hour of receiving the retransmission request from the MOC.	Derived			X	X		X			T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SN2030	The SN shall store data by VCID for selective retransmission.	Derived				X		X				T	This is intended to be implemented by the Ku-band FEP.
SN2040	The SN shall perform virtual channel synchronization and error correction, using the CCSDS AOS standards for S-band data.	Derived				X						T	
SN2045	The SN shall perform virtual channel synchronization and error correction, using the CCSDS AOS standards for Ku-band data.	Derived				X						T	This is intended to be implemented by the Ku-band FEP.
SN3000	The SN shall provide the personnel and facilities to support pre-launch interface and system test activities	Derived		X								D	This includes planning, performing and assessing the tests.
SN3500	The SN shall provide the ability for the MOC to request SN services.	Derived			X								This is currently performed via SWSI.

Requirement				Planned Verification									Re...
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
SN1010	The SN shall be able to schedule two separate TDRS S/C to support GLAST simultaneously for the purpose of obtaining Differenced-One-Way Doppler ranging data.	Derived			X						T	The ability for the spacecraft to support DOWD is TBR.	
SN3510	The SN shall accept schedule requests for specific times from the MOC.	Derived			X		X				T		
SN3520	The SN shall provide TDRSS schedule data to the MOC.	Derived			X	X	X				T		
SN3530	The SN shall provide the DAS TDRS handover schedule to the MOC.	Derived						X			T	This will be implemented by SWSI.	
SN3535	The SN shall electronically notify the MOC of any pending changes to the DAS/TDRSS schedule at least 12 hours prior to the change.	Derived						X			T	This must be a message sent to the MOC system that can be read by software.	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
SN3540	The SN shall accept GLAST orbit vector updates from the MOC.	Derived			X						T	IIRVs. This will be implemented by SWSI.	
SN3550	The SN shall provide the near-term prediction TDRSS availability to the MOC for GLAST mission planning purposes. [RFA G001].	Derived			X		X				T	This refers to the TDRS unscheduled Time (TUT).	
SN3570	The SN shall provide a schedule of supports for the upcoming two weeks, each week.	Derived			X		X				T	Two weeks is dependent on ATS load time scale. This number should be double the duration of a typical ATS load.	
SN3590	The SN shall provide a TDRSS forward and return link service within 30 minutes of receiving the request from the MOC for high priority commanding.	Derived							X		D	This includes S/C anomalies.	

Requirement				Planned Verification									Re:
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
SN3600	The SN shall provide a forward and return link service for the execution of a ToO within 30 minutes of a request from the MOC.	Derived							X		D	
SN4000	The SN shall uplink commands and data to the observatory from the MOC.	3.4.2.3			X					X	T	
SN4010	The SN shall throughput the command data received from the MOC in real-time, without buffering, filtering, reformatting, processing or staging.	Derived			X						T, A	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GN4060	The SN shall forward telemetry frames from real-time VCs to the MOC within 1 second.	Derived			X							T	Time begins when the first bit of the CADU hits the antenna and ends when the transmission of that bit to the MOC begins. This does not include network transmission time.
SN4030	The SN shall forward command data received from the MOC to the S/C within 1 second.	Derived			X							T	Time begins when the first bit of the command is received by the station from the MOC and ends when that bit leaves the TDRSS antenna. This does not include network transmission time.

Requirement				Planned Verification										Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE				
SN4040	The SN shall send real-time data to the MOC in real-time, without buffering, filtering, reformatting, processing, or staging.	Derived			X							T, A	The specific parameters will be in the SN/MOC ICD.	
SN4050	The SN shall forward S-band telemetry frames from real-time VCs to the MOC within 1 second.	Derived			X							T	Time begins when first bit of the CADU hits the TDRSS antenna and ends when the transmission of that bit to the MOC begins. This does not include network transmission time.	

	Requirement			Planned Verification								Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE		
SN4055	The SN shall forward Ku-band telemetry frames from real-time VCs to the MOC within 1 second.	Derived			X						T	Time begins when first bit of the CADU hits the TDRSS antenna and ends when the transmission of that bit to the MOC begins. This does not include network transmission time.
SN4060	The scheduled SN service shall provide real-time data quality statistics to the MOC.	Derived			X						T	The specific parameters will be in the SN/MOC ICD. These parameters should include frame counts, missing VCDUs, uncorrectable VCDUs, and any other data statistics required by the MOC.

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SN4070	The SN shall provide real-time station status data to the MOC, including antenna angles, received signal strength, and any other station equipment status required by the MOC.	Derived			X							T	ODMs
SN4080	The SN shall provide station operational data messages to the MOC whenever the TDRS link is active.	Derived			X					X		T	
SN4100	The SN shall provide command and telemetry communications for on-orbit operations.	Derived			X							T	
SN4110	The SN shall provide an Ku-band return link service at a rate 40 Mbps.	x.x.x.x				X		X				T	
SN4120	The SN shall provide an S-band Single Access return link service at rates 1, 2, 4, and 8 kbps.	3.4.2.3			X							T	Support for lower rates (e.g., 4, 2, 1, 0.500, 0.250 kbps) may be required.

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
SN4130	The SN shall provide an S-band Multiple Access return link service at rates of 1 and 2 kbps.	3.4.2.3		X							T	Support for lower rates (e.g., 1, 0.500, 0.250 kbps) may be required.
SN4140	The SN shall provide an S-band Single Access forward link service at a rate of 4 kbps.	3.1.1.5.1.2		X	X						T	
SN4150	The SN shall provide an S-band Multiple Access forward link service at a rate of 250 bps.	3.1.1.5.1.2			X						T	
SN4155	The SN shall provide a Ku-band Multiple Access return link service at a rate of 40 Mbps.	3.4.3.3.2				X		X			T	
SN7000	The SN shall operate with an unattended MOC.	Derived			X			X			D	This includes planning and scheduling, pre-pass, real-time, post-pass, and routine analysis support to the MOC.

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SN8000	The SN shall forward alert telemetry to the MOC received on the DAS and Ku-band return link service.	3.5.2.8						X	X			T, A	Alert telemetry will either be on the DAS or Ku-band service and not simultaneously on both.
SN8020	The SN shall begin transmitting the burst data to the MOC from WSC within 5 seconds of receipt of the signal from the observatory for at least 80% of all burst alerts.	3.1.4.1				X		X				T, A	This is the time to get from the spacecraft transponder to initiate transmission to the MOC from WSC. The ability for the SN to support this 5 second latency given the current S/C design is TBR.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
MOC0010	The MOC shall perform mission planning & scheduling, command generation, real-time (R/T) command and telemetry processing, mission monitoring and analysis, data processing, and automated pass execution functions for command & control and health & safety monitoring of the GLAST S/C.	3.5.1.8			X							T	
MOC0020	The MOC shall be the sole interface for commands between the elements of the ground system and the space-ground communications links.	3.5.3.1.1										D	

Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments
				G1	G2	G3	G4	G5	G6	ETE		
MOC0030	The MOC shall support a single 8-hour by 5-day shift (M-F) approach and shall operate autonomously whenever not staffed.	3.5.1.3 3.5.1.8 derived			X		X	X	X		D	Operate here means receive and transmit telemetry and send pages if problems are encountered. Commands are not sent automatically.
MOC0040	The MOC shall allow authorized remote users to access system functions for viewing RT and historical data.	3.5.1.2 3.5.3.5 derived		X							T	
MOC0050	The MOC shall provide a web interface to authorized users for access to MOC data products.	3.5.3.5 3.5.1.2 derived			X		X	X			T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC0060	The MOC shall process observatory telemetry that is compliant with the Consultative Committee for Space Data Systems (CCSDS) Packet Telemetry Recommendations as defined in the Series 100 Blue Books.	3.5.2.4.3.1		X				X			T	Telemetry will be compliant with AOS Version 2.	
MOC0070	The MOC shall implement observatory commanding that is compliant with the CCSDS Telecommand recommendations as defined in the Series 200 Blue Books.	3.4.1.5 derived		X	X						T	Commanding will follow COP-1 protocol.	
MOC0080	The MOC shall utilize the COP-1 protocol to verify correct receipt of commands on the S/C.	3.4.1.5 derived		X							T		

	Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
MOC0090	The MOC shall maintain SAA boundary definitions relative to the S/C during the course of the mission.	3.5.2.2.3						X			T	The S/C will use the SAA entry and exit definitions and will notify the instruments accordingly. The MOC will maintain the on-board SAA map used by the S/C.	
MOC0100	The MOC shall maintain electronic documentation of operating procedures to specify the tasks to be performed for routine operational and contingency activities.	Derived		X							D		
MOC0110	The MOC shall maintain configuration control of the electronic documentation.	Derived		X							D		
MOC0120	The MOC shall restrict access to the electronic documentation to authorized operations personnel.	3.5.1.2		X							D		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC0150	The MOC facility shall restrict physical access to allow entry to authorized personnel only.	3.5.1.2 derived		X							D		
MOC0160	The MOC facility shall provide console, analysis and meeting space for the FOT, S/C engineers and the instrument team engineers during Launch and Early Orbit (L&EO).	Derived						X	X	X	D		
MOC0170	The MOC facility shall provide a voice communications system with the capability to connect to ground stations, Kennedy Space Center (KSC) launch site, the SN, the IOCs, the FDF, the Spacecraft I&T Facility, and the GSSC.	3.5.1.8 3.5.1.11						X			T	This can be a combination of dedicated (e.g., SCAMA) circuits and commercially-provided circuits (i.e., Black phone)	
MOC0180	The MOC facility shall provide UTC clock and countdown clock displays.	3.3.1.12 derived		X							D		

	Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC0190	The MOC facility shall provide a master time signal for the MOC systems.	3.3.1.12 derived		X								D	e.g. NASA 36
MOC0200	The MOC facility shall provide an uninterruptible power supply (UPS) to all the MOC systems.	Derived		X								D	This is to provide the opportunity to gracefully shutdown non-critical functions and allow backup power to be supplied.
MOC0210	The MOC facility shall access a backup power capability in the event of a utility power outage.	Derived		X								D	Current plans are to access diesel power in building 14.
MOC0220	The MOC facility shall provide black/white and color printers to generate reports, printouts, and plots as required.	Derived		X								D	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC0230	The MOC facility shall support R/T operations, mission planning, data processing, mission analysis and special operations (e.g. L&EO).	3.5.1.8 derived			X			X	X		D		
MOC0240	The MOC facility shall provide the physical resources to host the GIOC-provided BAP.	Derived						X			D	These resources include space, power, cooling, network access, etc.	
MOC4300	The MOC shall ingest and verify the observatory telemetry & command (T&C) database provided by the S/C vendor.	Derived		X				X			T	Verification includes syntax level checking of database, Ex. Command mnemonic created expected bit sequence.	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC4305	The MOC shall construct the ground segment database to define any ground commands or parameters to be processed by the MOC.	Derived		X								T	Ground parameters are items such as ground station statistics and ground commands are those needed to control the MOC system.
MOC4310	The MOC shall construct a Project Database (PDB) that consists of the observatory T&C database and the ground segment database.	Derived		X								T	
MOC4315	The MOC shall accept database updates from the IOCs and incorporate them into the PDB.				X							T	This applies to post-launch since the Observatory Data Base is no longer being provided by the S/C vendor.

	Requirement			Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC4320	The MOC shall maintain configuration control of the PDB, command PROCs, display page definitions and configuration monitor definitions.	Derived		X						X	D		
MOC0500	The MOC shall restrict computer access to authorized personnel	3.5.1.2 derived		X							D		
MOC0510	The MOC shall monitor for MOC network security violations and initiate paging to the appropriate personnel.	3.5.1.2 derived		X							T		
MOC1000	The MOC shall support mission operations 24-hours per day, 7 days per week	3.5.1.8 derived						X	X		D		
MOC1010	The MOC shall contribute a data loss of no more than 1%.	3.5.2.4.4				X					A	The total allocation for the ground system is 1.9%.	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC1020	The MOC shall be maintained for the entire mission lifetime with no loss in MOC capability or performance.	Derived		X							A		
MOC1500	The MOC shall interface with the ground station network for planning and conducting S/C contacts.	3.1.1.5.3 3.5.3.1.1 3.5.3.1.2					X				T		
MOC1510	The MOC shall interface with the SN for planning and conducting S/C contacts.	3.5.3.1.1 3.5.3.1.2			X	X					T		
MOC1520	The MOC shall interface with the GSSC for the exchange of mission planning and data products.	3.5.1.2 3.5.1.3 derived					X				T		
MOC1530	The MOC shall receive requests for retransmission of observatory data from the IOCs.	Derived					X	X			T		
MOC1540	The MOC shall submit requests for retransmission of observatory data to the ground stations.	Derived					X				T		

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC1550	The MOC shall interface with the GBM IOC for the exchange of mission planning and data products.	3.5.1.2 3.5.1.3 derived				X					T	The primary mission planning path is through the GSSC.	
MOC1560	The MOC shall interface with the LAT IOC for the exchange of mission planning and data products.	3.5.1.2 3.5.1.3 derived				X					T	The primary mission planning path is through the GSSC.	
MOC1570	The MOC shall interface with the S/C vendor facility for support of sustaining engineering functions.	3.5.2.2						X	X	X	T	This for example covers the receipt of FSW updates.	
MOC1580	The MOC shall exchange telemetry and command data with the GLAST S/C as specified in the GLAST *Spacecraft-MOC ICD* .	3.5.3.1.2 derived								X	T		
MOC1590	The MOC shall interface with the FDF for the exchange of orbit and attitude determination-related data.	3.5.3.2			X						T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC2000	The MOC shall perform Level 0 processing using observatory data files received from the ground stations and TDRSS.	3.5.1.3 derived		X			X				T		
MOC2010	The MOC shall generate Level 0 files for each contact that contain error free, time ordered non-duplicate series of packets.	3.5.1.3 derived		X		X					T	Each file may have one or multiple application identifications (APIDs). MOC will not merge dump files from multiple contacts meaning that there may be duplicate data across files.	
MOC2020	The MOC shall automatically monitor the delivery of telemetry data from the SN and alert the operations staff when the data is not received in the required time.	3.5.1.3 derived						X	X		T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC2030	The MOC shall automatically assess the quality of each file received from the SN and page appropriate personnel if problems are detected that require operator intervention.	3.5.1.3 derived			X			X			T		
MOC2040	The MOC shall maintain a record of the quality and completeness of the telemetry for the duration of the mission.	3.5.2.11 derived		X	X	X		X			D		
MOC2050	The MOC shall distinguish between test data and operational data.	Derived		X						X	T	Dependent upon having appropriate flags set in the data.	
MOC2060	The MOC shall generate meta-data for each Level 0 file that describes the characteristics of the file.	3.5.1.3 derived		X		X					T		

Requirement				Planned Verification								Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE		
MOC2070	The MOC shall generate the Level 0 data files and initiate transmission to the SSC and the IOCs within 4 hours of receiving the dump files from the ground station.	3.1.4.4.2 derived					X				T	Applies only if no problems are encountered that require operator intervention. Otherwise the data will be delivered on a best effort basis.
MOC2080	The MOC shall retrieve and process archived observatory data.	3.5.2.11 derived							X		T	
MOC2090	The MOC shall copy products to removable physical media.	Derived							X		D	
MOC2100	The MOC shall archive the Level 0 data files a minimum of seven days.	3.5.2.11 derived			X		X				T	This provides the capability to retransmit the files to the GSSC or IOCs as necessary.

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC2110	The MOC shall transmit real-time housekeeping data to the LIOC and shall be able to enable and disable this link.	3.5.1.3 derived			X							T	This is intended to be configurable in the MOC so that the real-time link to the LIOC is brought up only when needed.
MOC2120	The MOC shall transmit recorded Level 0 data to the GIOC and LIOC.	3.5.1.3 derived			X		X					T	
MOC2130	The MOC shall process delayed data within 24 hours of its arrival.	Derived						X				T	This is data resulting from a retransmission request sent by the MOC.
MOC3000	The MOC shall provide the personnel and facilities to support pre-launch interface and system test activities.	3.5.1.6 derived		X								T	This means that the personnel and system resources are provided as needed for the test activities
MOC3010	The MOC shall ingest telemetry and command databases directly from the IOCs for test support.	3.5.1.6 derived		X								T	

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**							**Method**		**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC3500	The MOC shall schedule all activities for the GLAST observatory except those autonomously executed by the S/C.	3.5.2.2 derived						X				T	The primary mission planning tasks are: A. Integrated Observatory Timeline Generation. B. Ground Station Scheduling. C. TDRSS Scheduling. D. ATS and RTS Load Creation and Management.
MOC3510	The MOC shall schedule all S/C and instrument engineering events within the constraints of the S/C and instruments.	3.5.2.2 derived										T	This applies to non-science related activities needed for observatory HK.
MOC3520	The MOC shall schedule all contacts with the S/C for command uplink and telemetry downlink.	3.5.3.1.1 3.5.3.1.2 derived			X							T	This applies to the SN/TDRSS and ground stations.

	Requirement			Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC3535	The MOC shall receive electronic notification from the SN of any pending changes to the DAS/TDRSS schedule at least 12 hours prior to the change.	Derived						X			T	This message must be in a format that can be read by software.	
MOC3530	The MOC shall accept flight software load requests from the S/C vendor facility and the IOCs including the FSW load and time/conditions to uplink.	3.5.2.2.2 derived			X						T		
MOC3540	The MOC shall provide TDRSS ephemeris information to the S/C.	3.5.2.2 derived			X						T	This provides information to communicate with TDRSS.	
MOC3550	The MOC shall manage the Solid State Recorder (SSR) to include dumping and re-dumping of science and engineering data.	3.5.2.2 derived				X	X	X			T		

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
MOC3560	The MOC shall maintain a record of all instrument loads and commands received from the GSSC or IOCs.	Derived			X						T		
MOC3570	The MOC shall recreate the FSW memory image in the event the on-board image is corrupted.	Derived							X		T	Applies to spacecraft and instrument FSW. Ensures that the MOC can recreate a flight memory image if there is an on-board CPU reboot.	
MOC3600	The MOC shall generate an Integrated Observatory Timeline.	Derived				X					T	The Integrated Observatory Timeline is based on inputs from the GSSC, ground stations, the SN, and flight operations. It contains a list of planned activities/events.	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC3610	The MOC shall use UTC time for planning and generation of commands.	3.3.1.8 derived			X							T	
MOC3620	The MOC shall produce ATS loads based on the Integrated Observatory Timeline.	Derived				X						T	
MOC3630	The MOC shall ingest and integrate the science timelines created by the GSSC.	3.5.2.3 derived				X						T	These timelines are sequences of onboard activities.
MOC3640	The MOC shall provide the Integrated Observatory Timeline to the GSSC and IOCs.	Derived				X						T	
MOC3650	The MOC shall provide the As-Flown Observatory Timeline to the GSSC and the IOCs.	Derived						X				T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC3660	The MOC shall update the on-board ATS command load based on late schedule change requests.	Derived							X		T	Here the users (IOCs, GSSC, and MOC) have determined that the planned observations already loaded on the S/C need to be changed.	
MOC3670	The MOC shall ingest and integrate the ground station contact schedules.	3.5.3.1.1 derived			X		X				T		
MOC3680	The MOC shall ingest and integrate the TDRSS contact schedules.	3.5.3.1.1 derived			X						T		
MOC3690	The MOC shall generate and manage command constraint definitions.	Derived			X						D		
MOC3700	The MOC shall verify all command loads against constraints prior to uplink to the S/C.	Derived						X			T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC3800	The MOC shall accept Target of Opportunity (ToO) observation orders from the GSSC.	3.5.2.7.2 derived							X		T		
MOC3810	The MOC shall provide an automatic acknowledgement of the receipt of a ToO order to the GSSC within 10 minutes.	3.5.2.7.2 derived							X		T		
MOC3820	The MOC shall send the GSSC a message that specifies the disposition of the ToO order.	3.5.2.7.2 derived							X		T		
MOC3830	The MOC system shall generate ToO commands, schedule TDRSS forward link service, and transmit the commands within 4 hours of receipt of the ToO order from the GSSC.	3.5.2.7.2							X		T	Does not include the time required by the GSSC for ToO handling. It does include the time to make the SN forward link service available

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC3840	The MOC shall maintain a log for the duration of the mission of all ToO orders and their dispositions.	3.5.2.11 derived							X			A	Does not include the time required by the GSSC for ToO handling. It does include the time to make the SN forward link service available
MOC3900	The MOC shall maintain a log for the duration of the mission of all ARs that execute, their dispositions, and their status.	3.3.2.4.1 derived						X				A	
MOC3910	The MOC shall notify appropriate science and operations personnel in the event of an AR	Derived						X				T	
MOC4800	The MOC shall generate orbital products using S/C provided orbit information and NORAD provided Two Line Elements (TLE).	3.5.3.2							X			T	

	Requirement			Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC4805	The MOC shall provide orbit and attitude-related telemetry data to the FDF.	3.5.3.2				X						T	MOC expected to provide extracted telemetry parameters to the FDF (e.g., sequential print files).
MOC4810	The MOC shall receive and ingest orbit products from the FDF.	3.5.3.2				X	X					T	Ingest means that the MOC will integrate the FDF orbit products with the mission planning function.
MOC4820	The MOC shall perform orbit propagation.	3.5.3.2			X							T	
MOC4830	The MOC shall ensure 1 second accuracy for a minimum of 3 days for Absolute Time Commands.	3.5.3.2			X							T, A	This drives the accuracy of the orbit propagation function in the MOC, and thus the accuracy of stored command execution times.

	Requirement			Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC4840	The MOC shall routinely deliver orbit data products to the GSSC and the IOCs.	3.5.3.2			X							T	This includes predictive and/or definitive data. The specific products are defined in the Operations Products ICD.
MOC4850	The MOC shall maintain a log of orbit solutions for the duration of the mission.	3.5.3.2			X							D	
MOC4860	The MOC shall provide the capability to uplink orbit ephemeris data to the observatory.	3.5.3.2							X			T	This capability is needed if the onboard GPS system is not functioning properly.
MOC4860	The MOC shall provide predicted ground station and TDRS view periods for the Omni and Ku antennas. Required accuracy of 1 second for a 3-day period.	Derived			X		X					T	

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**								**Method**	**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**				
MOC????	The MOC shall provide spacecraft day/night predictions, including umbra and penumbra event times. Required accuracy of 1 second for a 3-day prediction.	Derived			X							T	
MOC????	The MOC shall provide Solar beta angle predictions. Required accuracy of 0.1 degrees for a 3-day prediction	Derived			X							T, A	
MOC????	The MOC shall provide spacecraft ground track predictions. Required accuracy of 7 km for a 3-day prediction	Derived			X							T, A	
MOC????	The MOC shall provide predicted South Atlantic Anomaly (SAA) region entry and exit times. Required accuracy of 1 second for a 3-day prediction.	Derived						X				T, A	

	Requirement					Planned Verification							Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC4950	The MOC shall to schedule contacts with ground stations.	3.5.3.1.1 derived					X				T		
MOC4960	The MOC shall provide orbital elements to the ground stations for contact acquisition.	3.5.3.2 derived									T		
MOC4900	The MOC shall schedule the SN services.	3.5.3.1.1			X						T	This applies to scheduling TDRSS/DAS, WDISC MA, WDISC SSA, and Ku	
MOC4910	The MOC shall provide S/C orbit information to the SN for contact acquisition.	3.5.3.2			X						T	This applies to scheduling TDRSS/DAS, WDISC MA, WDISC SSA, and Ku	
MOC4000	The MOC shall receive, process and monitor telemetry data from the GLAST observatory.	3.5.1.3		X						X	T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
MOC4010	The MOC shall ingest and store all CCSDS transfer frames received.	3.5.2.11 derived		X							T		
MOC4020	The MOC shall receive R/T HK telemetry from the ground station at a maximum rate of 51 kbps.	3.5.3.1.2 derived					X				T		
MOC4030	The MOC shall receive and process R/T telemetry from TDRSS at a maximum rate of 51 kbps.	3.5.3.1.2 derived			X						T		
MOC4040	The MOC shall receive, process, and display status data from ground stations.	3.1.1.5.3					X				T		
MOC4050	The MOC shall receive, process, and display status data from the SN.	3.3.5.4 Observatory constraint extended to the MOC-derived			X						T		
MOC4060	The MOC shall receive burst telemetry from the ground stations and SN.	3.1.4.1.3 3.5.3.3 derived					X	X			T		

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE				
MOC4080	The MOC shall receive recorded observatory HK and science data post pass.	3.1.1.5.3 3.1.4.4.2 3.5.2.4.3.1				X	X				T	Science data will only come from the SN.	
MOC4090	The MOC shall receive and process S/C and instrument on-board processor memory dump and table dump data.	3.5.2.4.3.1			X						T	Provided to S/C vendor and the IOCs for further processing.	
MOC4100	The MOC shall receive and process observatory event and telecommand logs.	3.5.2.2 3.5.2.2.1			X						T	This will allow the FOT to view interpreted log reports for troubleshooting.	
MOC4110	The MOC shall identify questionable quality data based on information received from the ground stations and the SN.	3.5.2.4.1			X	X					T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC4120	The MOC shall provide transfer frame processing statistics on each VC and on the aggregate.	3.5.2.4.1			X	X						T	This will include items such as the total number of frames for each of: received, good frames, sequence errors, and Reed-Solomon decoding errors.
MOC4130	The MOC shall archive all incoming frame telemetry data for the life of the mission.	3.5.2.11										A	
MOC4150	The MOC shall extract parameter data from the observatory HK packets, and perform the necessary conversions per the T&C database.	Derived			X							T	Telemetry processing includes providing data extraction, state conversions and Engineering Unit (EU) conversions.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
MOC4200	The MOC system shall automatically monitor R/T and playback telemetry data for limit violations as defined in the PDB and provide operations notification.	Derived			X	X	X				T	Limit checking will be performed on both analog and discrete telemetry parameters. The MOC system will not perform limit checking on questionable quality data.	
MOC4350	The MOC shall receive unscheduled TDRSS messages containing S/C and instrument alert telemetry through the SN/Demand Access System (DAS).	3.5.3.1.2											
MOC4370	The MOC shall receive Burst telemetry from the S/C via the SN/DAS.	3.5.3.1.2							X		X	T, A		
MOC4500	The MOC shall display processed telemetry data and their associated quality and status attributes in R/T display pages.	Derived					X	X				D		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC4510	The MOC shall print telemetry snapshots of any display page.	Derived										D	
MOC4520	The MOC shall display telemetry data plots via screen plots.	Derived		X								D	
MOC4550	The MOC shall generate and display time-tagged event messages indicating all command activity, telemetry processing status, limit violations, configuration changes, and all error and warning conditions.	Derived		X								T	
MOC4560	The MOC shall log all event messages to a history file in the chronological order in which they are generated.	3.5.2.11		X								D	
MOC4570	The MOC shall retrieve and display logged system event messages.	3.5.2.11		X								T	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
MOC4600	The MOC shall send commands to the observatory using ground stations, and the SN/TDRSS.	3.5.3.1.1			X					X	T	This includes R/T commands	
MOC4610	The MOC shall transmit commands to the ground network (GN) at an effective uplink rate of 2 kbps.	3.5.3.1.2 derived					X				T	This includes R/T commands	
MOC4620	The MOC shall transmit commands to the SN/TDRSS at effective uplink rates of 250 bps and 4 kbps.	3.5.3.1.2 derived			X					X	T	This includes R/T commands	
MOC4630	The MOC shall generate R/T commands based on a combination of the definitions in the PDB and user input.	Derived		X							T	This includes R/T commands	
MOC4640	The MOC shall generate stored command loads, including absolute and relative time sequence loads (ATS and RTS).	3.3.2.2.7 3.3.2.3.10 derived						X			T	This includes R/T commands	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC4650	The MOC shall generate software memory loads for uplink to the S/C from flight software images provided by the S/C and instrument Flight Software (FSW) maintenance facilities.	3.5.2.2.2						X				T	This includes R/T commands
MOC4660	The MOC shall maintain a ground reference image for S/C memory.	Derived						X				T	
MOC4670	The MOC shall provide protection against the unintentional issue of a critical command, as indicated in the PDB by requiring the operator to explicitly allow the command to be sent.	Derived		X								T	
MOC4680	The MOC shall archive all executed commands for the life of the mission.	3.5.2.11 derived		X								D	

	Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments		
				G1	G2	G3	G4	G5	G6	ETE				
MOC4690	The MOC shall provide a user interface language for system configuration and control, telemetry monitoring and commanding.	Derived		X										
MOC4700	The MOC shall provide the capability to bypass COP-1 commanding.	3.4.1.5 derived			X						T			
MOC5000	The MOC shall monitor the MOC systems to determine any network and system process failures affecting processing functions.	Derived						X			T			
MOC5010	The MOC shall monitor external interfaces required for real-time operations to determine their availability for support.	3.5.3 derived						X			T	Will be limited by the availability of status information from the external systems.		
MOC6000	The MOC shall monitor the HK telemetry data for S/C and instrument health and safety.	3.5.2.2 3.5.2.2.1 derived			X		X				T			

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**							**Method**		**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**				
MOC6010	The MOC shall automatically process recorded observatory HK data when received from the ground stations and SN.	3.5.1.3				X	X					T		
MOC6020	The MOC shall create pass summaries that describe the results of each S/C contact.	Derived				X		X				T		This includes selected mnemonics, procedures executed, S/C events, system events, commands sent, and limit and configuration monitor violations.
MOC6050	The MOC shall extract specific parameter data and create a sequential print ASCII formatted file.	Derived				X						T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
MOC6030	The MOC shall generate sequential print files from recorded housekeeping data at up to ten times the real-time rate for trend analysis support.	Derived			X							T	The sequential print files are the collection of telemetry parameters that are used for trend plots, etc.
MOC6040	The MOC shall replay and process recorded housekeeping data at up to twice the real-time rate.	Derived			X		X					T	This provides the ability to replay previously recorded data through the real-time system.
MOC6100	The MOC shall monitor the configuration of the observatory and detect deviations from expected states.	3.5.2.2 3.5.2.2.1 derived											

Requirement				Planned Verification										Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE				
MOC6150	The MOC shall produce an as-flown timeline that reflects the observations that were actually executed on the observatory.	Derived											The as-flown timeline will be derived from the observatory housekeeping telemetry. This should reflect ToOs and auto repoints.	
MOC6160	The MOC shall provide the as-flown timeline covering a 24-hour period to the GSSC and the IOCs within 7 days.	Derived												
MOC6200	The MOC shall examine observatory data to determine if any unexpected deviations from the pre-planned timeline have occurred.	3.5.2.2 3.5.2.2.1 derived											This may be a manual or automated process and the frequency will be documented in the Flight Operations Plan.	
MOC6250	The MOC shall perform data trending and analysis of observatory HK data.	3.5.2.2 derived												

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
MOC6260	The MOC shall generate graphic and numeric plots and reports of historical observatory HK data.	3.5.2.2 derived											
MOC6270	The MOC shall maintain trends of key parameters for the life of the mission.	3.5.2.11 derived											Key parameters will be determined by the Flight Operations Team.
MOC6280	The MOC shall perform statistical analysis of selected parameters over selected time-spans.	3.5.2.2 derived											Ex. Daily maximum, minimum, mean and standard deviation statistics
MOC6290	The MOC shall provide access to trending and analysis capabilities via the Internet for analysis by remote users.	3.5.3.5 derived											
MOC6300	The MOC shall display and print reports, and save them to a file	Derived											

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC6310	The MOC shall provide the capability to export observatory HK data in ASCII format.	3.5.3.5 derived											Provides ability for external analysis applications to access observatory data (e.g., Excel tool).
MOC4750	The MOC shall monitor accuracy and performance of the S/C clock as it compares to UTC.	3.5.3.2 GPS derived								X		D	The ability to support this assumes that sufficient information is available in HK telemetry.
MOC7000	The MOC shall automatically detect ground system and S/C anomalies and page on-call personnel when appropriate.	3.5.1.3 derived							X			T	
MOC7010	The MOC shall support automated SN and ground station passes.	3.5.1.3 derived			X		X					T	Applicable to post L&EO phase for nominal operations.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
MOC7020	The MOC shall operate autonomously for at least 96 hours without operator intervention.	3.5.2.2 derived						X			T		
MOC8000	The MOC shall monitor burst alerts from TDRSS and initiate a page to appropriate on-call personnel for alerts meeting pre-defined criteria.	3.1.2.4 derived						X	X		T		
MOC8010	The MOC shall monitor emergency alert messages received from TDRSS and initiate a page to appropriate on-call personnel when the MOC is not staffed.	3.4.2.2.1 derived						X			T		
MOC8020	The MOC shall monitor HK telemetry messages from TDRSS and initiate a page to on-call personnel for any anomalies or limit violations as appropriate.	3.5.2.2 3.5.2.2.1 derived			X						T		

Requirement				Planned Verification								Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments
				G1	G2	G3	G4	G5	G6	ETE		
MOC8030	The MOC shall transmit burst telemetry to GIOC and Burst Alert Processor (BAP) received from ground stations and the SN.	3.5.3.3 derived						X			T	
MOC8040	The MOC shall transmit burst alerts to the BAP within 0.5 seconds of their receipt for at least 80% of the burst alerts.	3.1.4.1.3						X			T, A	Performance measured from receipt at the MOC to initiation of the transfer.
MOC9000	The MOC shall monitor autonomous S/C pass operations and ground systems without the presence of MOC personnel.	3.5.1.3 derived							X		T	
MOC9010	The MOC shall automatically log an anomaly report for system-detected events meeting pre-defined criteria.	Derived							X		T	
MOC9020	The MOC shall enter and manage S/C and ground system anomaly reports.	Derived			X				X		D	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
MOC9030	The MOC shall maintain for the life of the mission the database of all S/C and ground anomalies for both pre-launch and post-launch operations.	3.5.2.11 derived		X								D	
MOC9040	The MOC shall automatically send notifications to the FOT to alert them of important events in the MOC or on the S/C within 5 minutes of detecting the event.	3.5.1.3 derived								X		T	Notifications can be methods such as alphanumeric pages and emails. 60 secs too restrictive, what's driver? (from Doug)
MOC9050	The MOC shall maintain a log of all user notifications sent and acknowledgements received.	3.5.2.11 derived		X								T	
MOC9070	The MOC shall fail-over to a backup system within 1 minute for real-time operations.	3.5.2.4.4 derived							X			T	
MOC9060	The MOC shall provide backup capabilities for all MOC systems.	3.1.4.2.1.3 3.5.2.4.4							X			T	

	Requirement			Planned Verification								Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE		
MOC9080	The MOC shall be able to manually fail-over to a backup system within 30 minutes for all non-real-time functions.	3.1.4.4 3.5.2.4.4							X		T	This applies to staffed operations only.
MOC9090	The MOC shall restore backup capabilities after a MOC real-time system failure within 12 hours.	3.5.2.4.4 derived							X		T	
MOC9100	The MOC shall backup operational files and recover the system from the backup.	3.5.1.8 derived							X		T	
MOC9120	The MOC shall re-plan a 24-hour portion of the Integrated Observatory Timeline within 2 hours.	Derived							X		T	Notifications can be methods such as alphanumeric pages and emails. 60 secs too restrictive, what's driver? (from Doug)

	Requirement			Planned Verification									R
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
FDF0010	The FDF shall provide orbit analysis support to the MOC for the pre-launch, and L&EO phases.	3.5.3.2			X							D	May also be used for contingency support during the operations phase if needed.
FDF0020	The FDF shall validate the on-board computed attitude during the L&EO phase (TBD).	Derived								X		A	May also be used for contingency support during the operations phase if needed. Performed in the MOC.
FDF0030	The FDF shall receive GPS and attitude telemetry data from the MOC.	3.5.3.2			X					X		T	This allows for independent validation of on-board-generated orbit and attitude solutions.
FDF0035	The FDF shall receive the launch vehicle separation vector from KSC during launch.	3.5.3.2								X		T	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
FDF0040	The FDF shall provide orbit determination support using the launch vehicle separation vector.	3.5.3.2											
FDF0050	The FDF shall perform orbit determination using the MOC provided GPS data.	3.5.3.2											
FDF0060	The FDF shall perform orbit determination using TDRSS Differenced One-Way Doppler (DOWD) data provided by the SN.	3.5.3.2			X							T, A	
FDF0070	The FDF shall perform orbit determination using NORAD Two-Line Elements (TLE).	3.5.3.2											
FDF0080	The FDF shall provide predictive and definitive orbit products to the MOC.	3.5.3.2											

	Requirement				Planned Verification										Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
FDF0090	The FDF shall perform attitude determination using telemetry data provided by the MOC within an accuracy of 1.0 degrees (TBD).	Derived											It is expected that this will be performed by an FDF provided system in the MOC instead of the FDF facility.
FDF0100	The FDF shall provide attitude validation results to the MOC (TBD).	Derived											This can be satisfied by using an FDF display in the MOC facility.
LIOC0010	The LIOC shall adhere to mission specified data formats and standards.	3.5.1.5			X							D	The standards and formats for transferring data within the ground system will be documented in the Science Data Products ICD.
LIOC0060	The LIOC shall support an on-orbit operational lifetime of a minimum of 5 years following an initial period of on–orbit checkout.	3.1.1.2.3						X				A	

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**				
LIOC1000	The LIOC shall be maintained for the entire mission lifetime with no loss in LIOC capability or performance.	Derived			X						A		
LIOC1010	The LIOC shall maintain the integrity of LAT loads and science data.	Derived						X			T		
LIOC1500	The LIOC shall interface with the GSSC for the exchange of mission planning and data products.	Derived				X					T		

	Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**								**Method**	**Comments**
					G1	G2	G3	G4	G5	G6	ETE			
LIOC1700	The LIOC shall interface with the MOC for the exchange of mission planning and data products.	Derived				X							T	Mission planning and data products include for example instrument flight software loads and ToOs. The primary interface with the LIOC is the GSSC. The specifics will be defined in the Operations Data Products Document.
LIOC1710	The LIOC shall accept post-pass transmission of LAT and SC housekeeping Level 0 data from the MOC.	Derived				X		X	X				T	
LIOC1710	The LIOC shall receive LAT science and Observatory HK Level 0 data from the MOC.	Derived				X					X		T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
LIOC2000	The LIOC shall process LAT instrument data into a common form agreed upon by the LIOC and GSSC.	Derived				X		X			T	This will be defined in the Science Data Products ICD.	
LIOC2010	The LIOC shall develop the science analysis tools needed to analyze LAT Level 1 data.	3.5.2.6				X		X			D, T	These are the tools used to generate Level 2/3 products. These are provided to the GSSC for use by the general user community.	
LIOC2020	The LIOC shall develop the LAT Instrument Response Functions (IRFs) necessary for the analysis of Level 1 data.	Derived						X			T		
LIOC2030	The LIOC shall receive and process Level 0 LAT science event data into level 1 data.	Derived				X					T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
LIOC2040	The LIOC shall process overlapping Level 0 data delivered from the MOC.	3.5.2.6						X			T	Duplicate packets will be removed during processing. Overlapping packets could exist between individual L0 files meaning that there may be duplicate data across files.	
LIOC2050	The LIOC shall complete the processing of the Level 1 data within 24 hours of receipt of Level 0 data during normal operations.	Derived				X		X			T		
LIOC1500	The LIOC shall provide Level 1 data products to the GSSC.	Derived						X					
LIOC2070	The LIOC shall process delayed data within 24 hours of its arrival.	Derived						X			T	This is data resulting from a retransmission request sent to MOC.	

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
LIOC2080	The LIOC shall archive all Level 0 data for the life of the mission.	Derived			X							A	
LIOC2085	The LIOC shall use LAT science event data to validate and refine the burst alert information.	Derived						X				T	
LIOC2090	The LIOC shall provide the GCN with any improved burst locations.	Derived						X				T	
LIOC2100	The LIOC shall receive and process LAT unfiltered data from the MOC.	Derived			X	X						T	This is to ensure that the LIOC can differentiate between LAT engineering and science data.
LIOC2120	The LIOC shall convert LAT housekeeping data to engineering units and monitor instrument limits and Configuration states.	Derived			X							T	

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**							**Method**		**Comments**
				G1	G2	G3	G4	G5	G6	ETE				
LIOC2150	The LIOC shall develop and maintain the telemetry and command (T&C) databases for LAT operations.	Derived			X							T		
LIOC2160	The LIOC shall provide a validated LAT T&C database to the MOC.	Derived			X						X	T		
LIOC2180	The LIOC shall provide the MOC validated and verified changes to LAT T&C databases.	Derived			X				X			T		
LIOC3000	The LIOC shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived			X							D		This includes planning, performing and assessing the tests.
LIOC3500	The LIOC shall provide the GSSC mission operations planning and coordination for LAT.	Derived				X						T		
LIOC3500	The LIOC shall maintain a record of all instrument loads and commands sent to the GSSC or MOC.	Derived				X						D		

	Requirement						Planned Verification								Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**				**Test**						**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE					
LIOC3510	The LIOC shall coordinate scheduling and planning of LAT operations activities with the GSSC.	Derived				X						T		
LIOC3520	The LIOC shall nominally schedule the uplink of LAT loads via the GSSC.	Derived				X						T	Alternate path will be from the LIOC directly to the MOC for test, launch and early orbit and contingency support.
LIOC3525	The LIOC shall nominally provide LAT instrument loads and commands to the GSSC.	Derived				X						T	Instrument memory loads are table and FSW updates.
LIOC3530	The LIOC shall receive orbit data products from the MOC.	Derived			X			X				T	The orbit data products could be predictive or definitive products.
LIOC3550	The LIOC shall generate instrument memory loads for uplink to the LAT.	Derived				X						T	

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE				
LIOC3551	The LIOC shall nominally provide LAT instrument loads and commands to the GSSC.	Derived				X						T	Duplicate of LIOC3525!!!
LIOC3554	The LIOC shall provide instrument loads and commands directly to the MOC for uplink to the LAT.	Derived						X				T	This is for test, L&EO, and contingency support.
LIOC3555	The LIOC shall provide instrument loads and command requests directly to the MOC for uplink to the LAT.	Derived						X				T	This is for test, L&EO, and contingency support.
LIOC3600	The LIOC shall generate the load files to implement changes to LAT flight software.	Derived						X				T	
LIOC3610	The LIOC shall validate and verify changes to LAT flight software with the LAT test bed prior to release of modified LAT flight software for uplink.	Derived						X				T	

Requirement ID	Requirement Text	MSS Source ID	Criticality	G1	G2	G3	G4	G5	G6	ETE	Method	Comments
LIOC3620	The LIOC shall maintain and operate a LAT FSW test bed.	Derived						X			D	This is to support functions such as anomaly resolution, command procedure validation, and FSW load validation.
LIOC3630	The LIOC shall provide configuration control and maintain the integrity of the on-board LAT flight software for the duration of on-orbit mission operations.	Derived						X			D	
LIOC4000	The LIOC shall monitor, assess, and record the health and safety of the instrument.	Derived						X			D	
LIOC4005	The LIOC shall receive observatory real-time HK data from the MOC.	Derived			X					X	T	

The table's spanning headers: Requirement | Planned Verification | Re...; under Planned Verification: Test (G1–ETE), Method, Comments.

Requirement				Planned Verification									Re:
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
LIOC4010	The LIOC shall provide the capability to process and display real-time LAT and S/C HK data with appropriate indicators for out of limit conditions.	Derived			X							T	
LIOC1720	The LIOC shall receive and process to command histories, as-flown timelines, command procedures, observatory ephemeredes, Integrated Observatory Timelines, and operations logs developed by the MOC.	Derived			X	X	X	X				T	Formats are specified in the Operations Data Products ICD.
LIOC6000	The LIOC shall receive the as-flown timeline covering a 24-hour period from the MOC.	Derived						X				T	
LIOC6010	The LIOC shall produce, update, and make public the models used for the analysis resulting in the LAT source catalogs.	Derived						X				T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
LIOC6020	The LIOC shall submit requests to the MOC for retransmission of observatory data.	Derived			X	X		X			T	If the MOC decides the data needs to be retransmitted from the ground station then the request needs to be received within 4 days.	
LIOC6055	The LIOC shall monitor LAT health and status to verify proper operation of the instrument.	Derived			X						T		
LIOC6070	The LIOC shall maintain an operations log which records operations activities.	Derived			X						T	This includes all changes to flight and ground system configurations whether directly commanded or initiated autonomously.	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
LIOC6080	The LIOC shall perform trend analysis of LAT housekeeping data over the life of the mission to predict future performance and identify potential performance issues.	Derived				X					T		
LIOC6090	The LIOC shall archive all Level 0 housekeeping data received, and all trend analyses, operations logs, calibration updates, and LAT diagnostic data developed.	Derived			X						T		
LIOC6100	The LIOC shall use pre-launch test and calibration data to aid in assessing the performance of the instrument and adjust the instrument tables, engineering calibrations, or software.	Derived						X			D		

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
LIOC6200	The LIOC shall maintain knowledge of the LAT configuration as determined from the telemetry, command history and operations logs.	Derived			X							T	
LIOC7000	The LIOC shall accept autonomous data transfers from the MOC.	Derived			X	X	X	X				T	
LIOC7010	The LIOC shall automatically connect to the MOC for the real-time data link.	Derived			X							T	This ensures that the MOC and LIOC can automatically re-establish the real-time data link.
GIOC0010	The GIOC shall adhere to mission specified data formats and standards.	3.5.1.5			X							D	The standards and formats for transferring data within the ground system will be documented in the Science Data Products ICD.

| Requirement | | | | Planned Verification | | | | | | | | | Re |
| | | | | | | | | | | | | | |

Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments
				G1	G2	G3	G4	G5	G6	ETE		
GIOC0060	The GIOC shall support an on-orbit operational lifetime of a minimum of 5 years following an initial period of on–orbit checkout.	3.1.1.2.3						X			A	
GIOC1000	The GIOC shall be maintained for the entire mission lifetime with no loss in GIOC capability or performance.	Derived			X						A	
GIOC1010	The GIOC shall maintain the integrity of GBM loads and science data.	Derived						X			T	
GIOC1500	The GIOC shall interface with the GSSC for the exchange of mission planning and data products.	Derived				X					T	
GIOC1700	The GIOC shall interface with the MOC for the exchange of mission planning and data products.	Derived			X						T	Mission planning and data products include for example instrument flight software loads and ToOs.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
												The primary interface with the GIOC is the GSSC.	
GIOC1730	The GIOC shall interface with the GCN for the exchange of burst alert-related information.	Derived						X			T		
GIOC1710	The GIOC shall receive GBM science and Observatory HK Level 0 data from the MOC.	Derived			X					X	T		
GIOC2000	The GIOC shall process GBM instrument data into a common form agreed upon by the GIOC and GSSC.	Derived				X		X			T	This will be defined in the Science Data Products ICD.	
GIOC2020	The GIOC shall develop the science analysis tools needed to analyze GBM Level 1 data.	3.5.2.6						X			D, T	These are the tools used to generate Level 2/3 products. These are provided to the GSSC for use by the general user community.	

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
GIOC2030	The GIOC shall develop the GBM Instrument Response Functions (IRFs) needed for the analysis of Level 1 data.	Derived				X					T		
GIOC2040	The GIOC shall receive and process Level 0 GBM science event data into level 1 data.	Derived						X			T		
GIOC2050	The GIOC shall process overlapping Level 0 data delivered from the MOC.	3.5.2.6				X		X			T	Duplicate packets will be removed during processing. Overlapping packets could exist between individual L0 files meaning that there may be duplicate data across files.	
GIOC2060	The GIOC shall complete the processing of the Level 1 data within 24 hours of receipt of Level 0 data during normal operations.	Derived						X			T		

	Requirement			Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GIOC2065	The GIOC shall provide Level 1 data products to the GSSC.	Derived						X			T	
GIOC2070	The GIOC shall process delayed data within 24 hours of its arrival.	Derived										This is data resulting from a retransmission request sent to the MOC.
GIOC2080	The GIOC shall archive all Level 0 data for the life of the mission.	Derived			X						A	
GIOC2120	The GIOC shall convert housekeeping data to engineering units and monitor instrument limits and configuration states.	Derived			X						T	
GIOC2150	The GIOC shall develop and maintain the T&C databases for GBM operations.	Derived			X						T	
GIOC2160	The GIOC shall validate, verify and maintain configuration control for the commands and command procedures databases.	Derived			X			X			T	

Requirement				Planned Verification								Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE		
GIOC2180	The GIOC shall provide the MOC validated and verified changes to GBM operations databases.	Derived			X						T	
GIOC3000	The GIOC shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived				X					D	This includes planning, performing and assessing the tests.
GIOC3500	The GIOC shall provide the GSSC mission operations planning and coordination for GBM.	Derived				X					T	
GIOC3500	The GIOC shall maintain a record of all instrument loads and commands sent to the GSSC or MOC.	Derived			X		X				T	
GIOC3510	The GIOC shall coordinate scheduling and planning of GBM operations activities with the GSSC.	Derived				X					T	
GIOC3520	The GIOC shall nominally schedule the uplink of GBM loads via the GSSC.	Derived				X					T	

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GIOC3525	The GIOC shall nominally provide GBM instrument loads and commands to the GSSC.	Derived				X						T	Instrument memory loads are table and FSW updates.
GIOC3530	The GIOC shall receive orbit data products from the MOC.	Derived			X			X				T	Orbit data products include definitive and/or predictive data.
GIOC3550	The GIOC shall generate instrument memory loads for uplink to the GBM.	Derived				X						T	
GIOC3551	The GIOC shall nominally provide GBM instrument loads and commands to the GSSC.	Derived				X						T	
GIOC3554	The GIOC shall provide instrument loads and command requests directly to the MOC for uplink to the GBM.	Derived						X				T	This is for test, L&EO, and contingency support.
GIOC3555	The GIOC shall be capable of providing instrument loads and commands directly to the MOC for uplink to the GBM.	Derived						X				T	This is for test and L&EO support.

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GIOC3600	The GIOC shall generate the load files to implement changes to GBM flight software.	Derived						X				T	
GIOC3610	The GIOC shall validate and verify changes to GBM flight software with the GBM test bed prior to release of modified GBM flight software for uplink.	Derived						X				T	
GIOC3620	The GIOC shall maintain and operate a GBM test bed.	Derived						X				D	This is to support functions such as anomaly resolution, command procedure validation, and FSW load validation.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GIOC3630	The GIOC shall provide configuration control and maintain the integrity of the on-board GBM flight software for the duration of on-orbit mission operations.	Derived						X			D		
GIOC1740	The GIOC shall have access to command histories, as-flown timelines, command procedures, observatory ephemeredes, Integrated Observatory Timelines, and operations logs developed by the MOC.	Derived						X			D	Formats are specified in the Operations Data Products ICD.	
GIOC6000	The GIOC shall receive the as-flown timeline covering a 24-hour period from the MOC.	Derived						X			T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
GIOC6010	The GIOC shall submit requests to the MOC for retransmission of observatory data.	Derived				X		X			T	If the MOC decides the data needs to be retransmitted from the ground station then the request needs to be received within 4 days.	
GIOC6050	The GIOC shall monitor GBM health and status to verify proper operation of the instrument.	Derived			X						T		
GIOC6070	The GIOC shall maintain an operations log which records operations activities.	Derived			X						D	This includes all changes to flight and ground system configurations whether directly commanded or initiated autonomously.	

	Requirement					Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE					
GIOC6080	The GIOC shall perform trend analysis of GBM housekeeping data over the life of the mission to predict future performance and identify potential performance issues.	Derived			X							T		
GIOC6090	The GIOC shall archive all Level 0 housekeeping data received, and all trend analyses, operations logs, calibration updates, and GBM diagnostic data developed.	Derived			X	X								
GIOC6150	The GIOC shall use pre-launch test and calibration data to aid in assessing the performance of the instrument and adjust the instrument tables, engineering calibrations, or software.	Derived						X				D		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GIOC6200	The GIOC shall maintain knowledge of the GBM configuration as determined from the telemetry, command history and operations logs.	Derived											
GIOC7000	The GIOC shall support autonomous data transfers from the MOC.	Derived											This ensures that the GIOC is designed to interact with an unstaffed MOC.
GIOC8000	The GIOC shall provide the MOC with a system to reformat LAT and GBM burst alert data and forward to the GCN.	Derived						X			T		This is referred to as the GBM burst alert processor (BAP), which will be located in the MOC facility.
GIOC8005	The GIOC shall provide the MOC a system to generate improved burst locations from GBM burst alert data and forward the results to the GCN.	Derived						X			T		This is referred to as the GBM burst alert processor (BAP), which will be located in the MOC facility.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GIOC8010	The GIOC shall provide a backup capability for the burst alert system provided to the MOC.	3.5.2.8						X			T	This is intended to require a backup BAP capabilities at the GIOC.	
GIOC8020	The BAP and GIOC shall receive LAT and GBM burst telemetry from the MOC.	3.5.2.8						X			T	The BAP will generate GCN notices from the incoming burst alerts.	
GIOC8030	The GIOC shall validate and refine the burst alert information using improved algorithms and additional GBM data and forward results to the GCN.	Derived						X			T		
GIOC8040	The GIOC shall provide the GCN with any improved burst locations. [GSSC to get these directly from the GCN]	Derived						X			T		
GSSC0010	The GSSC shall perform science planning and generate a science timeline.	3.5.1.1											

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**				
GSSC0020	The GSSC shall provide the science data analysis tools to support the science community.	3.5.1.4												
GSSC0030	The GSSC shall adhere to mission specified data formats and standards.	3.5.1.5		X								D	The standards and formats for transferring data within the ground system will be documented in the Science Data Products ICD.	
GSSC0060	The GSSC shall support an on-orbit operational lifetime of a minimum of 5 years following an initial period of on–orbit checkout.	3.1.1.2.3						X				D		
GSSC0070	The GSSC shall organize and administer the GLAST GI Program.	Derived						X				D		

Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GSSC9010	The GSSC shall receive and archive reports and analyses from the MOC.	Derived											These are the products that the GSSC and MOC have determined are relevant to science data analysis.
GSSC9020	The GSSC shall provide all data products to the HEASARC.	Derived						X				D	
GSSC1000	The GSSC shall be maintained for the entire mission lifetime with no loss in GSSC capability or performance.	Derived			X							A	
GSSC1010	The GSSC shall maintain the integrity of LAT and GBM commands and flight software loads received from the IOCs.	Derived			X							T	This is intended to ensure that the GSSC does not corrupt or make any other changes to the data.

	Requirement				Planned Verification									Re:
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
GSSC1020	The GSSC shall maintain the integrity of science data received from the IOCs.	Derived				X					T	This is intended to ensure that the GSSC does not corrupt or make any other changes to the data.	
GSSC1500	The GSSC shall distribute data and software products to the scientific community	Derived						X			D		
GSSC1550	The GSSC shall provide access to the science community to the Level 1 data within 24 hours of receipt at the GSSC.	Derived						X			T	Applies only if no problems are encountered that require operator intervention. Otherwise the data will be delivered on a best effort basis.	
GSSC1570	The GSSC shall provide Level 2 data on the GSSC website and upon request.	Derived						X			D		
GSSC1580	The GSSC shall provide the HEASARC all databases by the end of the GLAST mission.	Derived						X			D		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GSSC1590	The GSSC shall deliver the as-flown timeline to the HEASARC.	Derived						X			T	
GSSC1600	The GSSC shall interface with the MOC for the exchange of mission planning and data products.	Derived			X						T	Mission planning and data products include for example instrument flight software loads and ToOs. The specifics will be defined in the Operations Data Products Document.
GSSC1603	The GSSC shall interface with the LIOC for the exchange of mission planning and data products.	Derived				X					T	Mission planning and data products include for example instrument flight software loads and ToOs.

	Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**	
				G1	G2	G3	G4	G5	G6	ETE			
GSSC1606	The GSSC shall interface with the GIOC for the exchange of mission planning and data products.	Derived				X						T	Mission planning and data products include for example instrument flight software loads and ToOs.
GSSC1610	The GSSC shall provide the MOC the science timelines to incorporate into the Integrated Observatory Timeline.	Derived				X						T	These timelines are sequences of onboard activities.
GSSC1620	The GSSC shall receive the Integrated Observatory Timeline from the MOC.	Derived			X							T	
GSSC1630	The GSSC shall receive the orbit data products from the MOC.	Derived			X							T	Orbit data products include definitive and/or predictive products.
GSSC1640	The GSSC shall receive the as-flown timeline from the MOC.	Derived						X				T	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GSSC2000	The GSSC shall maintain an archive of level 0, level 1 and level 2 products it receives.	Derived						X			T		
GSSC2010	The GSSC shall provide the capability to receive and archive Level 0 data for the life of the mission.	Derived		X							T	The GSSC does not have to worry about overlaps among Level 0 files.	
GSSC2020	The GSSC shall be responsible for producing and maintaining databases of the data products either received or produced.	Derived		X				X			T		
GSSC2030	The GSSC shall conform all databases to the standards of the HEASARC.	Derived			X			X			D		
GSSC2040	The GSSC shall handle overlapping Level 0 data delivered from the MOC when generating Level 1 data products.	Derived							X		T	This is needed for the backup pipeline processing.	

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
G SSC2050	The GSSC shall maintain a backup Level 1 pipeline for processing LAT science data. [Missing, exists in GSSC FRD]	Derived							X		T		
GSSC2060	The GSSC shall maintain a backup Level 1 pipeline for processing GBM science data. [Missing, exists in GSSC FRD]	Derived							X		T		
GSSC2070	The GSSC shall calculate and maintain sky exposure maps. [Missing, exists in GSSC FRD]	Derived			X						T	This will provide the science team a record of the uniformity of sky coverage by LAT.	
GSSC3010	The GSSC shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived						X			D	This includes planning, performing and assessing the tests.	
GSSC3500	The GSSC shall plan science observations and support science observation decisions.	Derived			X						T		

Requirement				Planned Verification										Re...
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE				
GSSC3510	The GSSC shall construct observation timelines after guest investigations have been selected.	Derived			X							T		
GSSC3520	The GSSC shall not schedule any instrument activities during an SAA.	Derived			X							T		
GSSC3530	The GSSC shall not nominally schedule any observations that would have the Earth enter the central field of view of the LAT.	3.1.4.2.2.2			X							T		
GSSC3540	The GSSC shall maintain a record of all instrument loads and commands sent to the MOC.	Derived				X						T		
GSSC3600	The GSSC shall receive ToO requests from the science community.	3.5.2.7.1							X			T		
GSSC3610	The GSSC shall evaluate a ToO request.	3.5.2.7.1							X			D		

Requirement				Planned Verification									R：
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
GSSC3620	The GSSC shall generate and send to the MOC a ToO order within 2 hours of Project Scientist approval of the ToO request.	3.5.2.7.2							X		T	
GSSC3630	The GSSC shall receive from the MOC information that specifies the status of the ToO order.	3.5.2.7.1							X		T	
GSSC3640	The GSSC shall maintain a log for the duration of the mission of all ToO requests and orders their dispositions and status.	3.5.2.7.1							X		T	
GSSC3650	The GSSC shall receive ToO execution notification from the MOC.	3.5.2.7.1							X		T	
GSSC3660	The GSSC shall provide notification to the ToO requester of the ToO execution results.	3.5.2.7.1							X		T	
GSSC3660	The GSSC shall support TBD% of the ToO requests.	3.5.2.7.1							X		T	

| Requirement | | | | Planned Verification | | | | | | | | | Re... |
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Requirement ID	Requirement Text	MSS Source ID	Criticality	G1	G2	G3	G4	G5	G6	ETE	Method	Comments
GSSC7000	The GSSC shall support autonomous data transfers to and from the MOC.	Derived			X			X			T	
GSSC7010	The GSSC shall support an automated MOC.	Derived						X			T	This ensures that the GSSC is designed to interact with the MOC while it is unstaffed.
GSSC8000	The GSSC shall receive GLAST-produced GCN notices and post them to the GSSC web-site.	Derived						X			T	
GCN1500	The GCN shall receive burst locations from the Burst Alert Processor (BAP).	3.5.3.3						X			T	These are locations from burst telemetry or calculations by the BAP that are sent automatically.

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
GCN1510	The GCN shall receive burst locations alerts from the GIOC.	3.5.3.3						X			T	These are locations calculated from burst telemetry or recorded science data. This involves "human-in-the-loop" processing.	
GCN1515	The GCN shall receive burst locations from the LIOC.	3.5.3.3						X			T	These are locations calculated from recorded science data. This involves "human-in-the-loop" processing.	
GCN1520	The GCN shall distribute the burst GCN Notices to the science community.	3.5.2.8						X			T		
GCN2000	The GCN shall perform any GCN unique reformatting of the data received from the BAP, or GIOC, or LIOC.	3.5.3.3						X			T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
GCN3000	The GCN shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived						X				D	This includes planning, performing and assessing the tests.
GCN7000	The GCN shall autonomously receive data from the BAP, GIOC or LIOC.	Derived						X				T	
HEA0010	The HEASARC shall provide and maintain the archive and software infrastructure necessary for the analysis of GLAST data and the integration of this data into the HEASARC's multi-mission system.	Derived						X				D	
HEA0020	The HEASARC shall integrate the GLAST specific tools developed into the general HEAdas system.	Derived						X				D	

	Requirement				Planned Verification								Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**							**Method**	**Comments**	
				G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**			
HEA1500	The HEASARC shall provide and maintain servers for the GSSC to maintain its databases and website.	Derived						X			D		
HEA1510	The HEASARC shall accept and archive data products from the GSSC.	Derived						X			T	Data products include science data products, reports, etc.	
HEA2010	The HEASARC shall make the GLAST observatory science and housekeeping data available over the Internet.	Derived						X			T		
HEA3000	The HEASARC shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived						X			D	This includes planning, performing and assessing the tests.	
SAI0010	The Spacecraft I&T Facility shall interface with the CTV for RF compatibility interface testing.	Derived									T	RF Compat Testing	

| Requirement | | | | Planned Verification | | | | | | | | | Re |
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments
				G1	G2	G3	G4	G5	G6	ETE			
SAI0020	The Spacecraft I&T Facility shall interface with the MOC for testing observatory/MOC telemetry and command compatibility.	Derived								X		T	
SAI0030	The Spacecraft I&T Facility shall provide the MOC with a validated Observatory T&C Data Base.	Derived		X						X		T	
SAI2000	The Spacecraft I&T Facility shall archive observatory telemetry and command data during selected observatory I&T and space/ground interface tests.	Derived								X		T	The specifics as to when the data shall be archived will be determined during the testing phase.
SAI3000	The Spacecraft I&T Facility shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived								X		T	This includes planning, performing and assessing the tests.

Requirement				Planned Verification										Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test								Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE				
SAI3010	The Spacecraft I&T Facility shall provide observatory data to the MOC for test support.	Derived								X		T	This allows the MOC to be able to receive real-time and stored data from the Spacecraft I&T Facility pre-launch.	
SAI3005	The Spacecraft I&T Facility shall allow the MOC to send commands to the observatory.	Derived								X		T		
SAI3020	The Spacecraft I&T Facility shall have the capability to take over all commanding functions and restore the observatory to a safe configuration at any point in any MOC controlled test.	Derived								X		T		

Requirement				Planned Verification									Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**	**Test**								**Method**	**Comments**
				G1	G2	G3	G4	G5	G6	ETE			
SAI3040	The Spacecraft I&T Facility shall have the ability to monitor observatory real-time operations during interface tests with the ground.	Derived								X		T	This ensures that the spacecraft contactor can independently (from the MOC) monitor observatory telemetry during ground interface tests.
SAI4000	The Spacecraft I&T Facility shall maintain the spacecraft flight software and provide the appropriate FSW updates to the MOC.	Derived											
KSC0010	The KSC shall provide access to voice circuits to the MOC during pre-launch and launch operations.	Derived											
KSC0500	The KSC shall ensure that only authorized users can access the system.	Derived											

Requirement				Planned Verification									Re
Requirement ID	Requirement Text	MSS Source ID	Criticality	Test							Method	Comments	
				G1	G2	G3	G4	G5	G6	ETE			
KSC1500	The KSC shall interface to the MOC for the exchange of observatory telemetry and command data.	Derived								X	T		
KSC2000	The KSC shall forward real-time observatory housekeeping data to the MOC in real-time without buffering, filtering, reformatting, processing, or staging.	Derived								X	T		
KSC2010	The KSC shall receive command data from the MOC and forward to the observatory without buffering, filtering, reformatting, processing, or staging.	Derived								X	T		
KSC3000	The KSC shall provide recorded observatory data (science and housekeeping) to the MOC.	Derived								X	T		

	Requirement				Planned Verification										Re
Requirement ID	**Requirement Text**	**MSS Source ID**	**Criticality**		**Test**								**Method**	**Comments**	
					G1	**G2**	**G3**	**G4**	**G5**	**G6**	**ETE**				
KSC4000	The KSC shall provide the personnel and facilities to support pre-launch interface and system test activities.	Derived									X		D	This includes planning, performing and assessing the tests.	
KSC3500	The KSC shall ensure MOC participation in pre-launch countdown simulations (Dry and Wet rehearsals).	Derived									X		D		
KSC4000	The KSC shall provide GLAST data to the MOC during pre-launch activities involving the observatory.	Derived									X		T		
KSC6000	The KSC shall provide post-separation vectors to the FDF.	Derived									X		T		

Note: GRT 7 is reserved for all regression testing not completed by GRT-6.

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